In the claims:

1. (Withdrawn) A fuel cell, comprising:

a well in a dielectric or semiconductor substrate, the substrate having a first side and a second side, the second side opposed to the first side, the well being defined in the first side;

a counter well defined in the second side, wherein an opening is defined in the substrate between the well and the counter well;

a thin film electrolyte layer having a first surface and a second surface, the first surface being opposed to the second surface, wherein the second surface contacts the well and covers the opening;

one of a thick film anode layer and a thick film cathode layer disposed on the electrolyte first surface and within the well; and

the other of the a thick film cathode layer and the thick film anode layer disposed on the electrolyte second surface and within the counter well.

2. (Currently amended) The fuel cell as defined in claim ~~1~~ 80 wherein the electrolyte layer has a thickness ranging from greater than 0 microns to about 20 microns.

3. (Previously presented) The fuel cell as defined in claim 2 wherein the electrolyte layer has a thickness greater than 0 microns to about 10 microns.

4. (Original) The fuel cell as defined in claim 3 wherein the electrolyte layer has a thickness ranging between about 2 microns and about 5 microns.

5. (Currently amended) The fuel cell as defined in claim ~~1~~ 80 wherein each of the anode and cathode layers has a thickness of at least about 30 microns.

6. (Original) The fuel cell as defined in claim 5 wherein each of the anode and cathode layers has a thickness ranging between about 30 microns and about 500 microns.

7. (Currently amended) The fuel cell as defined in claim ~~1~~ 79 wherein the anode layer has an interconnected porosity ranging between about 19% and about 55%; and the cathode layer has an interconnected porosity ranging between about 19% and about 55%.

8. (Original) The fuel cell as defined in claim 7 wherein each of the anode layer interconnected porosity and the cathode layer interconnected porosity ranges between about 20% and about 25%.

9. (Currently amended) The fuel cell as defined in claim ~~1~~ 79 wherein the electrolyte layer comprises a material selected from the group consisting of yttria stabilized zirconia, samaria doped ceria, partially stabilized zirconia, stabilized bismuthsesquioxide (Bi_2O_3), tantalum pentoxide (Ta_2O_5), and lanthanum strontium gallium magnesium oxide.

10. (Original) The fuel cell as defined in claim 9 wherein the electrolyte layer consists essentially of Ta_2O_5.

11. (Original) The fuel cell as defined in claim 9 wherein the electrolyte layer consists essentially of lanthanum strontium gallium magnesium oxide.

12. (Currently amended) The fuel cell as defined in claim ~~1~~ 79 wherein the anode layer comprises a material selected from the group consisting of nickel (Ni), Ni-yttria stabilized zirconia cermet, copper doped ceria, gadolinium doped ceria, strontium doped ceria, yttria doped ceria, Cu-YSZ cermet, Co-stabilized zirconia cermet, Ru-stabilized zirconia cermet, LSGM + nickel oxide, and mixtures thereof.

13. (Currently amended) The fuel cell as defined in claim ~~1~~ 79 wherein the cathode layer comprises a material having a perovskite structure.

14. (Original) The fuel cell as defined in claim 13 wherein the cathode layer comprises a material selected from the group consisting of lanthanum strontium manganate, lanthanum strontium ferrite, lanthanum strontium cobaltite, $LaFeO_3/LaCoO_3$, $YMnO_3$, $CaMnO_3$, $YFeO_3$, and mixtures thereof.

15. (Currently amended) The fuel cell as defined in claim ~~1~~ 79 wherein the cathode layer comprises silver.

16. (Currently amended) The fuel cell as defined in claim ~~1~~ 79, the fuel cell further comprising:

a first interfacial layer, positioned between the anode and the electrolyte; and

a second interfacial layer positioned between the cathode and the electrolyte.

17. (Original) The fuel cell as defined in claim 16 wherein the first interfacial layer comprises yttria doped ceria (YDC).

18. (Original) The fuel cell as defined in claim 16 wherein the second interfacial layer comprises yttria stabilized bismuthsesquioxide (YSB).

19. (Currently amended) The fuel cell as defined in claim ~~1~~ 79, further comprising a material for connecting the fuel cell to at least one of an electrical load or an electrical storage device, the connecting material deposited on at least one of the anode layer or the cathode layer.

20. (Withdrawn) A fuel cell, comprising:

a well in a dielectric or semiconductor substrate, the substrate having a first side and a second side, the second side opposed to the first side, the well being defined in the first side;

a counter well defined in the second side, wherein an opening is defined in the substrate between the well and the counter well;

a thin film electrolyte layer having a first surface and a second surface, the first surface being opposed to the second surface, wherein the second surface contacts the well and covers the opening;

one of a thick film anode layer and a thick film cathode layer disposed on the electrolyte first surface and within the well;

the other of the thick film cathode layer and the thick film anode layer disposed on the electrolyte second surface and within the counter well; and

a material for connecting the fuel cell to at least one of an electrical load and an electrical storage device, the connecting material deposited on at least one of the anode layer and the cathode layer;

wherein the electrical load comprises at least one of computers, portable electronic appliances, or communication devices.

21. (Withdrawn) A fuel cell, comprising:

a well in a dielectric or semiconductor substrate, the substrate having a first side and a second side, the second side opposed to the first side, the well being defined in the first side;

a counter well defined in the second side, wherein an opening is defined in the substrate between the well and the counter well;

a thin film electrolyte layer having a first surface and a second surface, the first surface being opposed to the second surface, wherein the second surface contacts the well and covers the opening;

one of a thick film anode layer and a thick film cathode layer disposed on the electrolyte first surface and within the well;

the other of the thick film cathode layer and the thick film anode layer disposed on the electrolyte second surface and within the counter well; and a material for connecting the fuel cell to at least one of an electrical load and an electrical storage device, the connecting material deposited on at least one of the anode layer and the cathode layer;

wherein the electrical storage device comprises at least one of capacitors, batteries, or power conditioning devices.

22. (Currently amended) ~~A fuel cell, comprising:~~

~~a well in a dielectric or semiconductor substrate, the substrate having a first side and a second side, the second side opposed to the first side, the well being defined in the first side;~~

~~a counter well defined in the second side, wherein an opening is defined in the substrate between the well and the counter well;~~

~~a thin film electrolyte layer having a first surface and a second surface, the first surface being opposed to the second surface, wherein the second surface contacts the well and covers the opening;~~

~~one of a thick film anode layer and a thick film cathode layer disposed on the electrolyte first surface and within the well;~~

~~the other of the thick film cathode layer and the thick film anode layer disposed on the electrolyte second surface and within the counter well; and~~

~~a material for connecting the fuel cell to at least one of an electrical load and an electrical storage device, the connecting material deposited on at least one of the anode layer and the cathode layer;~~

The fuel cell as defined in claim 19 wherein the connecting material has as a main component thereof a material selected from the group consisting of silver, palladium, platinum, gold, titanium, tantalum, chromium, iron, nickel, carbon, stainless steels, high temperature nickel alloys, tungsten, and mixtures thereof.

23. (Currently amended) The fuel cell as defined in claim ~~1~~ 79, further comprising a material for interconnecting at least two of the fuel cells, the interconnecting material deposited on at least one of the anode layer or the cathode layer.

24. (Original) The fuel cell as defined in claim 23 wherein the interconnecting material is a material selected from the group consisting of lanthanum chromites, nickel, copper, titanium, tantalum, chromium, iron, carbon, stainless steels, high temperature nickel alloys, tungsten, and mixtures thereof.

25. (Currently Amended) The fuel cell as defined in claim ~~1~~ 79, further comprising:

a plurality of the fuel cells arrayed within the substrate;
an electrical connection between the plurality of anode layers;
and
an electrical connection between the plurality of cathode layers.

26. (Original) The fuel cell as defined in claim 25 wherein the plurality of fuel cells are connected within a planar array, the planar array having a first plane adapted to contact a source of oxygen, the first plane having a plurality of cathode layers therein, the planar array further having a second plane opposed to the first plane, the second plane adapted to contact a fuel, the second plane having a plurality of anode layers therein.

27. (Original) The fuel cell as defined in claim 26 wherein the source of oxygen is air.

28. (Original) The fuel cell as defined in claim 26 wherein the fuel is selected from the group consisting of methane, butane, propane, pentane, methanol, ethanol, higher straight chain or mixed hydrocarbons, and mixtures thereof.

29. (Currently amended) The fuel cell as defined in claim ~~1~~ 79 wherein the fuel cell has a power density of between about 100 mW/cm^2 and about 2000 mW/cm^2.

30. (Original) The fuel cell as defined in claim 29 wherein the fuel cell has a power density of between about 1000 mW/cm^2 and about 2000 mW/cm^2.

31. (Original) The fuel cell as defined in claim 30 wherein the fuel cell has an operating temperature of between about 400°C and about 800°C.

32. (Original) The fuel cell as defined in claim 31 wherein the fuel cell has an operating temperature of between about 400°C and about 600°C.

33. (Original) The fuel cell as defined in claim 32 wherein the fuel cell has an operating temperature of between about 400°C and about 500°C.

34. (Withdrawn) A fuel cell, comprising:

a well in a dielectric or semiconductor substrate, the substrate having a first side and a second side, the second side opposed to the first side, the well being defined in the first side;

a counter well defined in the second side, wherein an opening is defined in the substrate between the well and the counter well;

a thin film electrolyte layer having a first surface and a second surface, the first surface being opposed to the second surface, wherein the electrolyte layer has a thickness greater than 0 microns to about 10 microns, and wherein the second surface contacts the well and covers the opening;

one of a thick film anode layer and a thick film cathode layer disposed on the electrolyte first surface and within the well; and

the other of the thick film cathode layer and the thick film anode layer disposed on the electrolyte second surface and within the counter well;

wherein each of the anode layer and the cathode layer has an interconnected porosity ranging between about 19% and about 55%, and wherein at least one of the anode or cathode layers has a thickness of at least about 30 microns.

35. (Cancel)

36. (Withdrawn) The fuel cell as defined in claim 34 wherein the electrolyte layer comprises a material selected from the group consisting of yttria stabilized zirconia, samaria doped ceria, partially stabilized zirconia, stabilized bismuthsesquioxide (Bi_2O_3), tantalum pentoxide (Ta_2O_5), and lanthanum strontium gallium magnesium oxide; wherein the anode layer comprises a material selected from the group consisting of nickel (Ni), Ni-yttria stabilized zirconia cermet, copper doped ceria, gadolinium doped ceria, strontium doped ceria, yttria doped ceria, Cu-YSZ cermet, Co-stabilized zirconia cermet, Ru-stabilized zirconia cermet, LSGM + nickel oxide, and mixtures thereof; and wherein the cathode layer comprises a material selected from the group consisting of lanthanum strontium manganate, lanthanum strontium ferrite, lanthanum strontium cobaltite, $LaFeO_3/LaCoO_3$, $YMnO_3$, $CaMnO_3$, $YFeO_3$, silver, and mixtures thereof.

37. (Withdrawn) The fuel cell as defined in claim 34, the fuel cell further comprising:

a first interfacial layer, positioned between the anode and the electrolyte; and

a second interfacial layer positioned between the cathode and the electrolyte.

38. (Withdrawn) The fuel cell as defined in claim 37, further comprising a material for connecting the fuel cell to at least one of an electrical load or an electrical storage device, the connecting material deposited on at least one of the anode layer or the cathode layer, wherein the electrical load comprises at least one of computers, portable electronic appliances, or communication devices, and wherein the electrical storage device comprises at least one of capacitors, batteries, or power conditioning devices.

39. (Withdrawn) The fuel cell as defined in claim 38, further comprising a material for interconnecting at least two of the fuel cells, the

interconnecting material deposited on at least one of the anode layer or the cathode layer.

40. (Withdrawn) The fuel cell as defined in claim 39, further comprising:

a plurality of the fuel cells arrayed within a substrate;

an electrical connection between the plurality of anode layers; and

an electrical connection between the plurality of cathode layers.

41. (Withdrawn) The fuel cell as defined in claim 40 wherein the plurality of fuel cells are connected within a planar array, the planar array having a first plane adapted to contact a source of oxygen, the first plane having a plurality of cathode layers therein, the planar array further having a second plane opposed to the first plane, the second plane adapted to contact a fuel, the second plane having a plurality of anode layers.

42 – 76 (Cancel).

77. (Withdrawn) A fuel cell system including a plurality of fuel cells, each of the fuel cells comprising:

a well in a dielectric or semiconductor substrate, the substrate having a first side and a second side, the second side opposed to the first side, the well being defined in the first side;

a counter well defined in the second side, wherein an opening is defined in the substrate between the well and the counter well;

a thin film electrolyte layer having a first surface and a second surface, the first surface being opposed to the second surface, wherein the second surface contacts the well and covers the opening;

one of a thick film anode layer and a thick film cathode layer disposed on the electrolyte first surface and within the well; and the other of the a thick film cathode layer and the thick film anode layer disposed on the electrolyte second surface and within the counter well;

wherein the fuel cell system comprises:

a planar array of the plurality of the fuel cells within a the substrate;

an electrical connection between the plurality of anode layers; and

an electrical connection between the plurality of cathode layers.

78. (Withdrawn) The fuel cell system as defined in claim 77 wherein the planar array has a first plane adapted to contact a source of oxygen, the first plane having a plurality of cathode layers therein, the planar array further having a second plane opposed to the first plane, the second plane adapted to contact a fuel, the second plane having a plurality of anode layers.

79. (Currently amended) A fuel cell, comprising:

an electrolyte layer having a first surface and a second surface, the first surface being opposed to the second surface, the electrolyte layer being disposed within a recess within a ~~dielectric or semiconductor~~ substrate;

one of an anode layer and a cathode layer disposed on the electrolyte layer first surface; and

the other of the cathode layer and the anode layer disposed on the electrolyte layer second surface.

80. (Previously presented) The fuel cell as defined in claim 79 wherein the electrolyte layer is a thin film and wherein at least one of the anode layer or the cathode layer is a thick film.

81. (Previously presented) The fuel cell as defined in claim 79 wherein the substrate has opposed outer surfaces, and wherein at least one of the anode layer or the cathode layer is substantially flush with one of the substrate opposed outer surfaces.

82. (Previously presented) The fuel cell as defined in claim 79 wherein the recess has been etched into the substrate.

83. (New) The fuel cell as defined in claim 79 wherein the substrate is a dielectric or semiconductor substrate.